COLLEGE OF NAVAL WARFARE

Newport, Rhode Island

18 May 1998

Scientific and Technical Intelligence for the Operational Commander

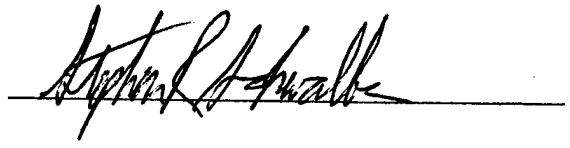
by

Stephen R. Schwalbe

Lt Col, USAF

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirement of the Joint Military Operations Department.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Departments of the Navy or Air Force.

Signature: 

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED	
2. Security Classification Authority:	
3. Declassification/Downgrading Schedule:	
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.	
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT	
6. Office Symbol: C	7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207
8. Title (Include Security Classification): Scientific and Technical Intelligence for the Operational Commander (U)	
9. Personal Authors: LTCOL Steve Schwalbe, USAF	
10.Type of Report: FINAL	11. Date of Report: 18 May 1998
12.Page Count: 20	
13.Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.	
14. Ten key words that relate to your paper: Scientific & Technical Intelligence (S&TI) Military, Defense Intelligence Community, DIA	

15.Abstract:

Scientific and Technical Intelligence (S&TI) is one of the least understood disciplines of intell, yet perhaps one of the most important to the operational commander. The highest priorities for S&TI is to prevent an opponent from surprising the U.S.with new technological weapon systems in battle, and, in the event of failure, to produce countermeasures in a timely manner. Beginning in World War II, new technological weapons have characterized and influenced conflict. Yet, today, while there are several thousand S&TI analysts in the Defense Intel Community, their primary focus is on enemy weapon characteristics and performance (C&P) for Service acquisition program countersystem design and budget justiciation, not on the operational commander. This shortcoming was hightlighted during the 1991 Persian Gulf War when the CENTCOM J2 could not get C&P data on Iraqi Scuds. This papermakes recommendations to begin to rectify this critical shortcoming.

16.Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17.Abstract Security Classification: UNCLASSIFIED			
18.Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19.Telephone: 841-6461		20.Office Symbol: C	

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INTRODUCTION

Admiral Thomas H. Moorer, before becoming Chairman of the Joint Chiefs of Staff, said, "I believe the greatest military danger facing our country lies in the possibility of a major technical surprise."[1]

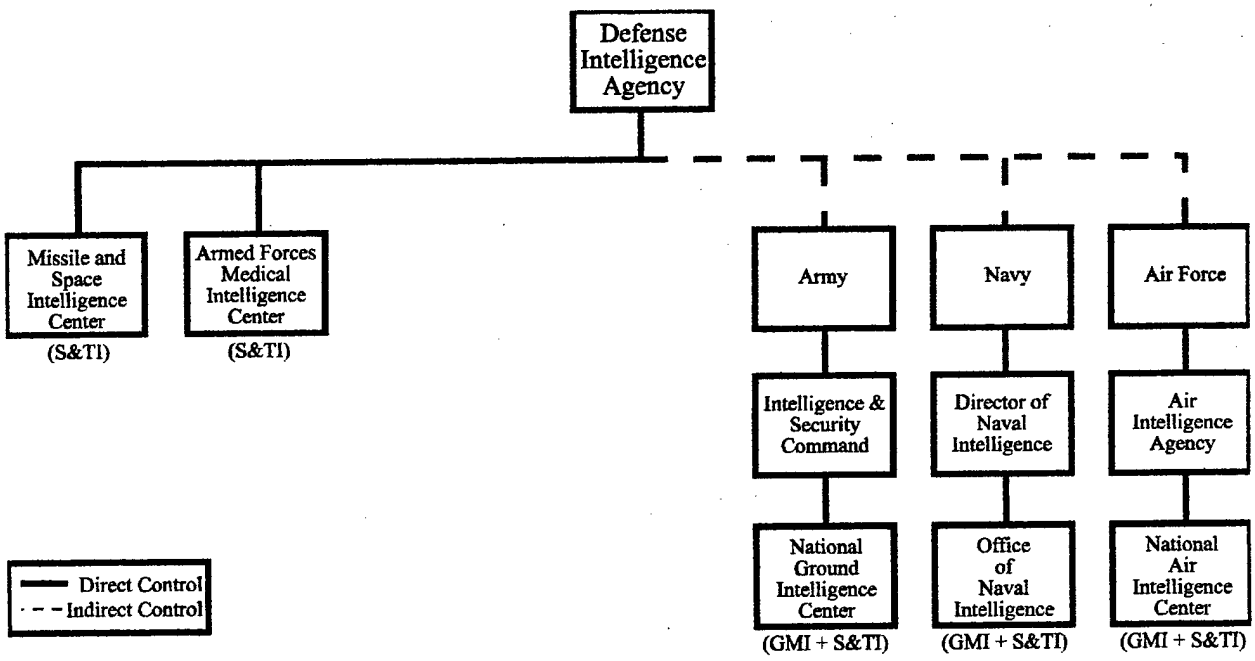
Scientific and technical intelligence (S&TI) is one of the least recognized intelligence fields, yet is probably the most important. Its primary use in practice is to provide the threat characteristics and performance data for weapon-system acquisition planning. However, its primary purpose is to prevent being surprised in war by an enemy's new weapon system or employment strategy. Most people agree with Professor Michael Handel of the Naval War College that: "The unexpected appearance of new weapons on the battlefield, from the stirrup to the atomic bomb, can have a critical impact on the outcome of war."[2] The development/ employment of a new weapon system is a force multiplier that, used in combination with surprise, provides a commander with a significant advantage over an opponent. In World War II, for example, the appearance of the Japanese Zero over Pearl Harbor and the Far East was a total surprise to the Americans and the British in 1941; it was superior in performance to any Allied fighter in the Pacific theater.[3]

The 1997 U.S. National Military Strategy stated that numerous regional powers "have access to wealth, technology, and information, potentially giving them greater military capability."[4] It further noted that: "Some state or nonstate actors may resort to asymmetric means to counter the U.S. military....Such threats [include] the emergence of new technologies that neutralize some of our military capabilities...."[5] I believe that for the U.S. military to effectively and efficiently counter this projected technology threat, S&TI needs to be included in both deliberative and crisis planning at the operational/theater-strategic level. Currently, S&TI is not considered at that level; only general military intelligence (GMI).

The growth of S&TI during the 20th century has been in direct proportion to the growing technical sophistication of military weaponry. Before World War II, there were few requirements for S&TI. However, during World War II, new weapon systems, like the radar, sonar, the Me-262 jet fighter, V-2 rocket, and the atomic bomb, created inequities between fighting forces that did or could have changed the course of the war.[6] Since then, S&TI has received greater emphasis, but almost exclusively from the Services and national policy-makers.

My intent is to show the inadequacies of the DoD S&TI Community in general, and how it can adversely affect deliberate and crisis planning at the operational level. I will begin with a discussion about the current status of the DoD S&TI Community. Then, I will analyze three major concerns about operational-level S&TI. Finally, I will discuss the deficiencies in deliberative and crisis action planning, and recommend some ways to overcome these shortfalls.

U.S. DOD S&TI COMMUNITY



STATUS

In future wars, the combatants will rely even more heavily on the contributions of science and technology. We can expect the appearance of many more new weapons in each succeeding war.[7]
(Michael Handel, Naval War College)

Definitions

The Defense Intelligence Agency (DIA) defines S&TI as: "The study of the scientific and technical capacities and activities of all nations....The task of S&TI is the forecasting and evaluation of new weapons and equipment of foreign armed forces."[8] According to the Central Intelligence Agency (CIA), S&TI includes "information on technical developments and characteristics, performance, and capabilities of foreign technologies....Generally, such technical analysis and reporting responds to specific national requirements...."[9]

The nature of S&TI is in-depth, broad-scope, and long-term. The Defense Intelligence College teaches that for S&TI analysts to understand the development of foreign weapon systems, they must have a thorough knowledge of the process and rationale that governs their development.[10] This means that an analyst must understand all aspects of the technologies and expertise that make up a weapon system. This takes time and resources.

Because S&TI is so specialized and expensive, only government agencies tend to produce it. The primary government organizations involved in S&TI production are in DoD and CIA.[11] I will focus on the S&TI within DoD because it is the biggest producer and consumer of S&TI.

The Secretary of Defense tasked DIA in DoD Directive 5105.21 to: 1) project future threat potentials; 2) evaluate foreign weapon vulnerabilities; 3) aid in countermeasure development; and, 4) avoid technological surprise.[12] To accomplish these basic tasks, DIA and the Services developed six primary S&TI production centers which together form what is known as the DoD S&TI Community.

The DoD S&TI Community

The DoD S&TI Community is managed by DIA and consists of: 1) DIA itself; 2) the Army's National Ground Intelligence Center (NGIC); 3) the Air Force's National Air Intelligence Center (NAIC); 4) the Navy's Office of Naval Intelligence (ONI); 5) DIA's Missile and Space Intelligence Center (MSIC); and, 6) DIA's Armed Forces Medical Intelligence Center (AFMIC) [reference chart on page 2].[13] This is a "community" because there is no agreed upon director with budget and personnel authority over all the member organizations. As the general manager, the DIA Director leads by persuasion, not mandate.[14]

The S&TI production centers are almost entirely focused on providing threat assessments on foreign weapon systems for the Services, the Secretary of Defense, and Congress. These technical weapon system threat assessments are used to design U.S. weapon systems to counter the potential threat, and, thereby, justify the Services' weapon system acquisition budgets. The S&TI is generally not oriented towards a CINC's planning efforts, even though Joint Pub 5-0, "Doctrine for Planning Joint Operations," indicates that one of the fundamentals for campaign planning is to "identify any special forces or capabilities the enemy has in the area."[15]

Gulf War S&TI Shortfall

During the 1991 Gulf War, Coalition commanders had many questions about the capabilities of the Iraqi SCUD ballistic missiles, especially after Saddam Hussein authorized the first launches against Coalition targets. What kind of warheads could they carry? What was their range and accuracy? What was the turn-around time between launches? These were all valid S&TI questions by the CINC which, when answered, would allow his staff to plan for force protection and countermeasures. Unfortunately, General Schwartzkopf had no S&TI capability to address these concerns, nor had any plans been made to acquire S&TI if it became needed.[16]

When General Schwartzkopf turned to the National Military Intelligence Center (NMIC) in the Pentagon, he found it also had no resident S&TI expertise. The NMIC contacted the Missile and Space Intelligence Center (MSIC), which subsequently provided the characteristics and performance data on Iraqi ballistic missiles to the CENTCOM J-2 in relatively short order.

Attempt to Solve Problem

Following the Gulf War, MSIC took the initiative to resolve the "lesson learned" that operational S&TI planning was needed prior to and during conflict. Under the concept that one trains as one intends to fight, MSIC attempted to institutionalize a communication process and mechanism in peacetime to provide the operational commander with ready access to S&TI.

The result was a program called Technical Operational Intelligence (TOPINT) established in 1991. TOPINT consisted of a small cell of missile and space scientists and engineers located in the NMIC; they provided customers with answers to time-sensitive, missile-related S&TI questions. Both the JCS J-2 and DIA Director endorsed the program.[17] Shortly after TOPINT was established, MSIC became part of DIA.

In 1992, the DIA Director told MSIC to expand the TOPINT program to include all of the S&TI production centers. Unfortunately, this never happened because it was seen by the other S&TI production centers as an inefficient use of valuable and scarce resources, and because none of the centers believed MSIC should be in charge of such a Community-wide program.[18]

CJCS Direction

The Chairman of the Joint Chiefs of Staff's 1993 report on the "Roles, Missions, and Functions of the Armed Forces of the United States" stated that:

> Although the Joint Task Force commander can receive intelligence support from the combatant CINC's JIC, such an organization does not provide the commander the ability to rapidly integrate intelligence information from the battlefield with information from national and Service intelligence units [which is where the S&TI expertise resides]. This capability is necessary to assist timely decision-making during combat and other contingency operations.[19]

DoD IG Report on S&TI Production

From 1994 to 1995, the DoD Inspector General conducted an extensive inspection of S&TI production. The final report, issued on 11 April 1996, directed that: "The Director, DIA, in conjunction with the Service intelligence production centers, restructure the TOPINT Program to include participation from each of the S&TI production centers, except the medical center in peacetime." All three of the Services *nonconcurred* with this recommendation because they all believed they could provide S&TI to the CINCs themselves more efficiently and effectively than the TOPINT program.[20]

Today, the National Military Joint Intelligence Center (NMJIC) [the NMIC changed its name in 1993] still has no S&TI expertise, the Unified Commanders still have no S&TI expertise resident in their joint intelligence centers (JICs), and there are no processes in place allowing for S&TI to be considered in the planning process. Thus, this important lesson learned during the Gulf War still has not been rectified.

CONCERNS

Warfighters need S&TI to successfully carry out their combat missions. Without knowledge of enemy weapon systems, the U.S. Armed Forces are susceptible to technological surprises on the battlefield. (DoD IG Final Report on S&TI Production)

Cost Effectiveness

Instead of participating in a restructured TOPINT program, the Services went their separate ways. The Air Force's National Air Intelligence Center (NAIC) established a 24-hour watch to accommodate any customer's requirement at any time. The Navy's approach was to have the NMJIC act as its 24-hour watch and have all naval S&TI issues called in forwarded to its S&TI production center, the Office of Naval Intelligence (ONI). The Army advised customers to reference the DoD Intelligence Production Program responsibilities guide (known as "Lanes in the Road") to find out which S&TI center is responsible for an issue, and then contact it directly.[21] Three different solutions from three different organizations for the same problem.

The Army's approach -- hardly "customer-oriented," may have evolved because of its perceived shortage of S&TI specialists. The Navy's approach could work if its watch officer had previous S&TI experience and knew the experts in each scientific and technical area within ONI -- but, they generally do not. Finally, the Air Force's solution is effective, but not efficient for the S&TI Community as it would require customers to know which of the six centers to contact.

Time Factor

Professor Handel once observed: "Even the most accurate intelligence is worthless unless it can be communicated in time for the commander to make and implement the appropriate decisions."[22] Because of the long-term nature of S&TI production, it may not be timely enough to accommodate changes in plans, either before or after conflict has begun. However, there have been cases where S&TI was able to produce countermeasures in a timely manner. For example,

during World War II in May 1943, the Royal Air Force was taking a severe beating at night by the Luftwaffe in part due to the German TRE radar. According to Brian Johnson, BBC reporter, in a revealing expose on the technology battles during World War II:

> The need for countermeasures was now very great, as the loss rate to German night fighters was reaching unacceptable proportions. In an effort to reduce these losses, a bewildering number of jammers, and counters, and counters to counters, in the battle against German radar, were developed.[23]

British S&TI developed an effective countermeasure to the German radar within a few months. Known as chaff, it was employed for the first time on 24 July 1943 in a night raid on Hamburg.[24]

Throughout the modern era, the time from scientific discovery to military application has been decreasing. A Defense Intelligence College textbook states that: "A shortening of lead time from scientific discovery to application proceeds steadily. In critical areas in the future this interval could be deceptively brief....This telescoping of time from science to application is an issue of importance to the S&TI analyst."[25] This means that the S&TI analyst has even less time to find out what enemy scientists are working on and how to counter it before a new weapon system is fielded in combat. For military development programs with few weapons being produced, like the Manhattan Project, the discovery becomes even more problematic, and the opportunity to develop and deploy effective countermeasures decreases proportionally.

On the other hand, there is nothing sacrosanct about technology taking longer periods of time to exploit or defeat. In fact, some experts believe there has *never* been any real technological surprises in war. Handel determined that there has always been enough collected intelligence to prevent us from being surprised on the battlefield by a new weapon system or force employment. "In almost all cases of new weapons used during war, there was access to more than enough evidence concerning the existence of these new weapons...to provide timely warning."[26]

The problem has been putting these pieces together effectively and ensuring they reach the right customers in time -- in this case, the CINC.

History has shown that it is possible for S&TI to come up with countermeasures in a timely manner. An enemy technological capability may be sophisticated or rudimentary which can affect how long it takes to develop countermeasures. Other examples of timely development of a countermeasure, besides the aforementioned chaff, include the gas mask to counter the mustard gas in World War I; flares to counter heat-seeking missiles and concrete-filled LST's used for minesweeping during the Vietnam War; the MiG-25 built to counter the XB-70 during the Cold War; and, the recalibration of the Patriot surface-to-air missile system to intercept SCUD ballistic missiles during the Gulf War.[27]

Bureaucracy

A nation's technology base can be both an advantage and disadvantage regarding S&TI. It is an advantage in that analyzing a new weapon system means being able to first accurately determine its characteristics and performance. High-tech nations will have a better capacity, therefore, to exploit new enemy weapon systems than less technically-sophisticated nations.[28] For example, the U.S. even has a special S&TI program called Foreign Materiel Exploitation established solely to acquire and exploit foreign weapon systems.

On the other hand, the bigger the S&TI Community is, the more bureaucratic it may become. This can lead to the possibility of reports being adversely influenced by biases, ethnocentricity, security compartmentalization, internal politics, lack of coordination, and the like.

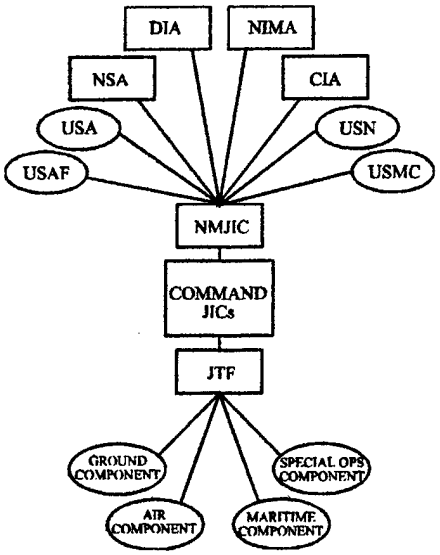
Major General S. Woodburn Kirby related a story about early bureaucratic problems regarding S&TI from World War II. In May 1941, a Japanese Zero was shot down over China, recovered, and exploited by the Allies. The U.S. Air Attaché in China forwarded all the

performance data to Headquarters, Air Command, which had no intelligence staff. This staff deficiency resulted in this invaluable report remaining untouched and unused.[29]

The S&TI Community in the U.S. is one of the largest bureaucracies within the Intelligence Community with several thousand analysts.[30] Each Service has a self-interest towards acquiring new high-tech weapon systems. Hence, an ingrained bias may invariably influence Service S&TI threat assessments towards a greater threat than actually exists. Handel noted this potential problem writing that: "The principle technological surprise is not to be found on the collection level or attributed to the absence of information; it is, instead, the outgrowth of problems on the level of analysis."[31]

To counter this instinct, DIA created a validation process that requires the Services to submit their system threat assessment reports (STARs) to DIA for an independent assessment before submitting them for any acquisition milestone review. Unfortunately, due to a Congressionally-mandated draw down, DIA no longer has the S&TI analysts it once had dedicated to doing just this. Furthermore, not all system threat assessments are even produced by a Service S&TI production center! The Army uses its combat developers (i.e., Training and Doctrine Command) and materiel developers (i.e., Army Materiel Command) to produce the threat assessments they are tasked to counter. The Assistant Secretary of Defense for C3I observed that: "The Army should shift production of STARs to the National Ground Intelligence Center. This is a parallel arrangement to that of the other Services and assures some arms-length relationship between the threat statement and the planning to address the threat." The Army rejected this recommend-ation stating that its program was working fine.[32]

INTELLIGENCE CONNECTIVITY STRUCTURE



Source: Derived from the Director, DIA, in the American Intelligence Journal, 1993-1994

RECOMMENDATIONS

> **The role played by S&TI in war will increase in proportion to the technological advancement of the adversaries and the use they make of state-of-the-art weaponry.... The war of the future will be a fast-paced conflict in which there is little time to learn by trial and error - and the side that makes the best pre-war preparations, especially within the intelligence community, will have the better chance of emerging victorious.**[33] (Dr. Michael Handel, Naval War College)

Incremental changes have the best chance of being implemented. I am not recommending any force structure modifications or anything that would require additional resources - just a change in the current way business is done in the Defense Intelligence Community. Techno-logical surprise has been more common at the lower levels of war, yet the processes and mechanisms in place today to handle it below the strategic level are strictly *ad hoc*. This may be the most inexpensive way to manage this threat, but it is *not* the most efficient and effective way.

Planning for S&TI

The Unified Command J2 staff, the associated JIC, and Service Component Command intelligence staffs are tasked to provide the necessary intelligence for deliberate and crisis action planning. These organizations contain primarily general military intelligence (GMI) analysts and resources. Unfortunately, there is no resident S&TI capability in any of them.

At the national and Service level, there is an on-going effort to collocate S&TI and GMI analysts to improve the intelligence product so it provides the customer with all the needed intelligence in one publication. Recently, as part of the DoD downsizing and to produce more effective intelligence products, GMI and S&TI were consolidated within the Service intelligence production centers and within DIA itself (reference chart on page 2). Unfortunately, this effort did not permeate down to the Unified Command JICs, probably due to the shortages in scientists and engineers. The lack of S&TI analysts in the Unified Commands results in a general unawareness of S&TI capabilities and limitations. These S&TI capabilities and limitations need to be accommodated for operational planning to be effective.

Deliberate Planning Recommendations

o Establish Analyst Exchange Program

An analyst exchange program should be established between the JICs and the six S&TI production centers. This would give the JICs a limited S&TI capability to use in deliberate planning. In turn, all of the exchange participants would gain a greater appreciation for the capabilities and requirements of one another's fields of expertise. The combatant commander's staff would understand the capabilities and limitations of S&TI for deliberative and crisis planning; while, the S&TI analysts would learn how S&TI can help the operational planners

posture their forces to effectively deal with any technical surprises on the battlefield. (The exchange tour of duty should be at least 12 months long to be productive.)

o Single Point of Entry

In the case that the needed S&TI expertise is not available to the combatant commander, there needs to be a systemic way to acquire it in a timely manner, especially during a crisis. I believe a single point-of-entry into the S&TI Community should be established in the NMJIC following the model depicted in the chart on page 11. According to two NMJIC senior managers, the need to support the warfighter with S&TI from the NMJIC is critical.[34]

To validate this approach, I looked within the Defense Intelligence Community for existing benchmarks. There are two. When signals intelligence is needed at any time, the customer can contact the National Security Agency's National Signals Intelligence Operations Center. When imagery intelligence is needed at any time, the customer can contact the National Imagery and Mapping Agency's Operations and Tasking Directorate. It makes sense, then, that for S&TI issues the customer should only have one place to call at any time.

However, in order to be efficient and effective, each NMJIC Service desk should be manned by an officer with previous experience in an S&TI production center who can quickly get the right person to handle any customer's request. Today, the NMJIC Service desks are manned with the "best available" officer without regard to S&TI experience or background.[35]

o Deception Countermeasure

Technological surprises in battle cannot always be prevented no matter how good one's intelligence capabilities are. It is possible, as well, that a surprise technological weapon system may not be easily exploited. However, as long as some information can be obtained on the new weapon, S&TI analysts can assist in developing operational-level deception plans to temporarily

diminish its effects until effective countermeasures can be developed. Dr. Handel wrote that: "Deception is by far the most effective way to counter the effects of new weapons in modern technological warfare. A well-planned deception operation causes the enemy to squander his resources...."[36]

The U.S. Army Field manual 100-5 defines deception as "operations designed to mislead enemy decision-makers."[37] Although S&TI and deception plans are generally classified, the Soviets successfully employed the deception technique of bluffing throughout the Cold War. Most of the Soviet leaders used bluffs to deceive the West of their actual military capabilities to buy time to really develop such weapons. For example, one well-known bluff was employed by Stalin when he told Roosevelt that he was already familiar with the atom bomb during the 1945 Potsdam Conference, even though the Soviet Union's atomic bomb program was still several years away from success. Another World War II example involved Britain's pathfinder radar "Gee" that was thought to be discovered by the Germans. The Brits quickly devised a false radar system "J" to throw the Germans off. Johnson stated that: "As to the effectiveness of these intelligence moves, the spoof "J" Beams went on the air and were duly jammed, while the real aid, Gee, went unjammed for five months -- a very long time indeed."[38]

Crisis Action Planning Recommendations

During every phase of Crisis Action Planning, the J-2 is tasked with coordinating with every possible intelligence organization within DoD, except the Service S&TI production centers.[39] As previously mentioned, one reason for this may be the lack of familiarity with S&TI. Another probable reason is that enemy technological weapons are difficult to predict, and generally hard to counter in a timely manner assuming a short war. However, as demonstrated earlier, this is a fatalist's paradigm that has not always been the case in recent history.

The unfamiliarity of CINC's planning staffs with S&TI is probably the reason the Service S&TI production centers are not included as a recommended resource for manning a national intelligence support team (NIST). A NIST is composed of intelligence and communication experts specifically from CIA, DIA, NSA, and NIMA. It is established to provide a JTF commander a direct liaison with the national-level intelligence organizations during a crisis as an augmentation to his staff.[40] To have the capability to accommodate all possible threat contingencies during conflict, I would advocate that the NIST composition include representatives from each of the three Service intelligence production centers.

CONCLUSION

The bottom line is that when lives are at stake in battle, every effort should be made, especially regarding intelligence, to ensure our side has effective operational plans and superior combat power against all opponents. S&TI has been recognized as a key to force protection, but has yet to be properly integrated and planned at the operational/theater-strategic level. The recommendations offered in this paper would provide a modest beginning toward rectifying this significant deficiency. All CINCs need to create combat plans incorporating S&TI capabilities and limitations, both in peacetime and in crisis. The U.S. has been somewhat fortunate that this continued oversight of not accounting for enemy technology by the Department of Defense has not cost more lives in battle, if not an entire war.

NOTES

[1] Cited from Dennis Darlak's An Introduction to Scientific and Technical Intelligence, published by the Defense Intelligence College, 1993, p. 3-1.

[2] Cited from Handel's book, War, Strategy, and Intelligence, published by Frank Cass in 1989, p. 131.

[3] Ibid., p. 138.

[4] Cited from the U.S. National Military Strategy 1997, published by DoD, p. 8.

[5] Ibid., pp. 9, 10.

[6] The examples were from Darlak's textbook, An Introduction to Scientific and Technical Intelligence, pp. 2-16 and 3-1.

[7] Cited from Handel's book, War, Strategy, and Intelligence, p. 174.

[8] Cited from Darlak's textbook, An Introduction to Scientific and Technical Intelligence, pp. 2-16, 2-17.

[9] Cited from CIA's Consumer's Guide to Intelligence, 1995, p. 7.

[10] Discussed in Darlak's textbook, An Introduction to Scientific and Technical Intelligence, p. 4-3.

[11] Within CIA, the S&TI organizations include the Directorate of Science and Technology and the Office of Scientific and Weapons Research. (From CIA's Consumer's Guide to Intelligence, p. 12.)

[12] DoD Directive 5105.21, "Defense Intelligence Agency," dated 19 May 1977.

[13] Discussed in DoD IG's Final Report on the Inspection of S&TI, number IR96-005, 11 April 1996, p. 4.

[14] Discussed by Bernard Grundy on page 146 in the book The Military Intelligence Community edited by Gerald Hopple and Bruce Watson, 1986.

[15] Cited from Joint Pub 5-0, "Doctrine for Planning Joint Operations," p. II-20.

[16] On many of the Unified Command staffs there exists a science/technology advisor who is normally a scientist or an engineer. However, this person has no intelligence expertise. The "Science Advisor" specializes in U.S. and allied technological capabilities; his job is to facilitate the acquisition and integration of new intelligence systems within the commander's theater of operation. Many of these advisors come from Service acquisition commands, not from S&TI production centers. Few, if any, know much about an enemy's science and technology, hence, they could not be expected to produce the intelligence needed for countermeasure development. This information was derived from telephone conversations with the scientific advisors to SOUTHCOM (Mr. Mondrick) and CENTCOM (Mr. Rubright) on 9 April 1998.

[17] This discussion on TOPINT was gleaned from the DoD IG Final Report, p. 47.

[18] This information was derived from interviews I conducted at all six S&TI production centers in 1994.

[19] Cited from the DoD IG Final Report, p. 48.

[20] Ibid., pp. 50-51.

[21] Ibid., pp. 44-46.

[22] Cited from a book Handel edited, Intelligence and Military Operations, published by Frank Cass, p. 5.

[23] Cited in Brian Johnson's report on operational S&TI during World War II, The Secret War, published by BBC in 1978, p. 113.

[24] Ibid., p. 117.

[25] Cited from Darlak's textbook, An Introduction to Scientific and Technical Intelligence, p. 3-4.

[26] Cited from Handel's book, War, Strategy, and Intelligence, p. 171.

[27] Examples taken from Darlak's textbook, An Introduction to Scientific and Technical Intelligence, p. 3-4.

[28] Discussed in Handel's book, War, Strategy, and Intelligence, p. 156.

[29] This story was told in the book Handel edited, , Intelligence and Military Operations, p. 138.

[30] Cited from Darlak's textbook, An Introduction to Scientific and Technical Intelligence, p. 4-3.

[31] Cited from Handel's book, War, Strategy, and Intelligence, p. 171.

[32] The contents of this paragraph are from the DoD IG Final Report, pp. 28-31.

[33] Cited from Handel's book, War, Strategy, and Intelligence, p. 170.

[34] Cited from the DoD IG Final Report, p. 50.

[35] The NMJIC Deputy Team Chief, Lt Col Toomey, provided this insight during a telephone call on 9 April..

[36] Cited from Handel's book, War, Strategy, and Intelligence, p. 168.

[37] Cited from U.S. Army Field Manual 100-5, Operations, 1993, p. 6.

[38] Cited from Johnson's book, The Secret War, p.87.

[39] Cited from Joint Pub 2-01, "Joint Intelligence Support to Military Operations," pages II-3-13.

[40] Cited from Joint Pub 2-0, "Joint Doctrine for Intelligence Support to Operations," page VII-12. Since being established in 1996, NIMA has been accorded permanent membership on the NIST.

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